



# The Quarterly Review

## of Interest Rate Risk

Volume 3, Number 1

First Quarter 1998

### Interest Rate Sensitivity Remains Unchanged in the First Quarter

Interest rate sensitivity remained the same for the thrift industry in the first quarter of 1998. At the end of the first quarter, the median sensitivity measure produced by the OTS Net Portfolio (NPV) Model was 153 basis points, showing no change from the previous quarter. The industry's ability to absorb interest rate shocks improved slightly, as the median post-shock NPV ratio increased to 10.5 percent.

#### I. SUMMARY OF NPV MODEL AGGREGATE RESULTS

The median sensitivity measure remained unchanged at 153 basis points at the end of the first quarter (Chart 1, page 4). The lack of movement in sensitivity is accounted for by an unchanged yield curve. The yield curve at the end of March was virtually identical to the yield curve at the end of December (Chart 2, page 4). As a result, the effective durations of the industry's assets and liabilities remained essentially the same (Chart 3, page 5).<sup>1</sup>

The median pre-shock NPV ratio for the industry increased to 12.1 percent in March, and the median post-shock NPV ratio rose slightly 10.5 percent (Chart 4, page 5).

#### A. ASYMMETRY OF GAINS AND LOSSES

Table 1 (page 9) reports the percentage change in both the aggregate net portfolio value and NPV ratio for the industry under

different interest rate scenarios. The loss in net portfolio value when interest rates increase is greater than the gain in aggregate net portfolio value when interest rates decrease. In the first quarter of 1998, the thrift industry would lose 16.4 percent of its net portfolio value if rates rose by 200 basis points, but would gain only 4.4 percent in value if rates fell by 200 basis points.

As observed in past quarters, exposure to changes in interest rates was particularly pronounced at some thrifts. The right panel of Chart 5 (page 6) shows the distribution of the percentage change for an increase in interest rates of 200 basis points. Of the 1,080 reporting thrifts, 89 percent would experience a loss of net portfolio value in that scenario. About 30 percent of the industry (323 thrifts) would lose more than 20 percent of their economic value if interest rates rose by 200 basis points. The left panel of Chart 5 shows the industry distribution of gains and losses in net portfolio value for a decrease of 200 basis points in interest

rates. Under this scenario, approximately 73 percent of reporting thrifts would experience increases in their net portfolio values.

Chart 6 (page 6) compares the distributions of gains and losses for the first quarter of 1997 with those for the first quarter of 1998 given both a 200 basis point decrease and increase in interest rates.

## B. INDUSTRY PROFILE

The pre- and post-shock NPV ratios of each reporting thrift are plotted in the NPV Sensitivity Chart (Chart 8, page 7). In this chart, the horizontal axis represents a thrift's pre-shock NPV ratio and the vertical axis represents its post-shock NPV ratio. The 45 degree line represents the "zero sensitivity line," where pre- and post-shock NPV ratios are equal. Each dot denotes the pre- and post-shock NPV capital ratios for a thrift. The two thrifts with post-shock NPV ratios of less than 4 percent appear in the area below the dotted horizontal line. A thrift whose post-shock NPV ratio is below the 4 percent line either has a relatively low level of capital, a high degree of NPV sensitivity, or both. Thrifts with exposure ratios below 4 percent should strengthen their capital position or reduce their interest rate sensitivity.

The number of thrifts with exposure measures below 4 percent decreased in the first quarter to two (see Chart 7, page 7). Historically, this is the smallest number of thrifts with exposure ratios below 4 percent. This low number is consistent with both the recent high equity capital ratios in the industry and the large percent of well-capitalized individual thrifts.

## C. REGIONAL PROFILE

The top panel of Chart 9 (page 8) presents the median sensitivity measures for the entire industry and each OTS region for the first quarter of 1997 and 1998. The Northeast Region had the largest median sensitivity measure in the first quarter of 1997, while the Midwest Region had the smallest. In comparing the first quarter of 1997 and 1998, the Midwest Region experienced the largest decrease in median interest rate sensitivity, while the Southeast Region had the smallest decrease in the median sensitivity measure.

The lower panel of Chart 9 shows the median post-shock NPV ratio for the thrift industry and each OTS region. The increase in post-shock NPV ratios between the first quarter of 1997 and 1998 for the entire industry and each region suggests an overall decrease in interest rate risk exposure was widespread.

## II. CHARACTERISTICS OF MOST AND LEAST SENSITIVE THRIFTS

In this section, we examine some selected characteristics of thrifts in the top and bottom deciles when thrifts are ranked by the size of their sensitivity measure in the first quarter of 1998. For thrifts in the bottom decile (the least sensitive thrifts), the median sensitivity measure was 24.5 basis points and the median post-shock NPV ratio was 10.98 percent. In contrast, for thrifts in the top decile (the most sensitive thrifts), the median sensitivity measure was 380 basis points and the median post-shock NPV ratio was 10 percent.

Table 2 (page 9) reports durations for total mortgages, total assets, and total liabilities (including intangibles) for the

most and least sensitive thrifts. A thrift's sensitivity measure is related largely to a mismatch between the durations of the assets and liabilities (including net off-balance sheet contracts) held in its portfolio. As Table 2 shows, differences in asset durations explain most of the higher sensitivity for the most sensitive thrifts. There is virtually no difference between the duration of liabilities for the least sensitive thrifts (1.49) and the most sensitive thrifts (1.45). Durations for total mortgages and total assets for the thrifts in the bottom decile, however, are much smaller than those for thrifts in the top decile. Indeed, for the least sensitive thrifts, the duration for total assets (and total mortgages) is less than that for total liabilities. This is not the case for the most sensitive thrifts. This result shows that the assets held by the least sensitive thrifts re-price much more frequently than do the assets held by thrifts with the greatest exposure to interest rate risk.

A key reason for this difference in asset and mortgage durations is the composition of the mortgage portfolios for the two groups. For the least sensitive thrifts, ARMs accounted for 73 percent (the median value) of total mortgages, while fixed-rate mortgages accounted for only 27 percent (the median value). The corresponding percentages (the median values) for the most sensitive thrifts were 13 and 87 percent, respectively. The least sensitive group also have mortgages accounting for 43.7 percent (the median value) of their total assets, whereas, for the most sensitive group, the mortgage share of total assets is 63.5 percent (the median value).

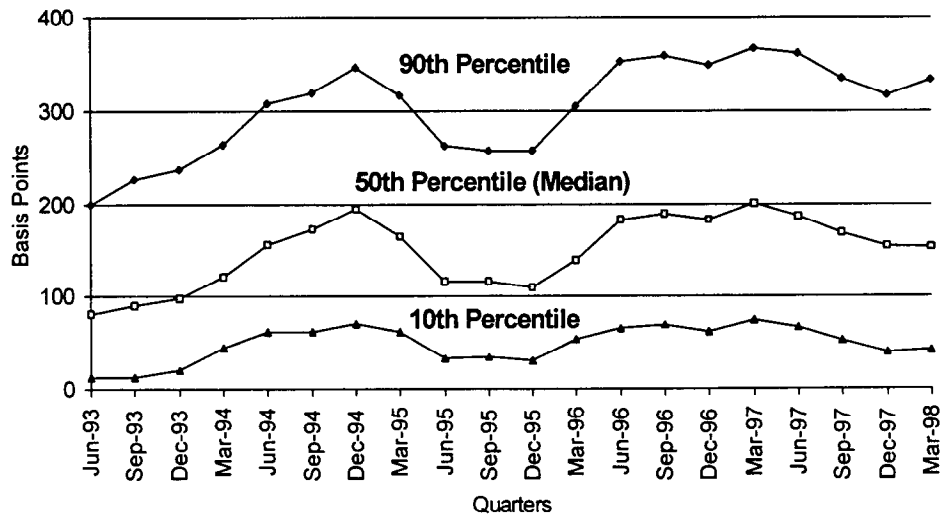
### III. TRENDS IN MORTGAGE-RELATED INTEREST RATES

Chart 10 (page 8) displays plots of two mortgage-related interest indices and the Freddie Mac commitment rate for thirty-year fixed-rate mortgages, as reported by the Federal Reserve Board, during the past two years. The two interest indices are the one-year constant maturity Treasury (one-year CMT), which is representative of the various indices used to set one-year adjustable rate mortgages (ARMs), and the ten-year constant maturity Treasury (ten-year CMT). The plots show that the ten-year CMT index tracks the commitment rate for thirty-year fixed-rate mortgages (FRMs) well.

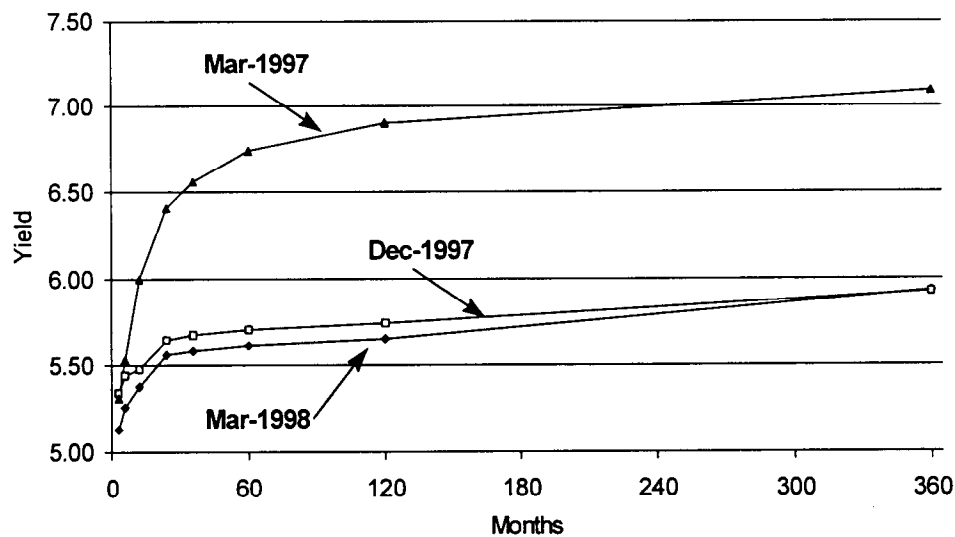
The absolute and relative (to the one-year CMT) decline in the ten-year rate has had two effects. First, the decline in the long rate makes a FRM now relatively more attractive than an ARM. This should result in a higher percentage of fixed-rate mortgages among new originations. Second, the lower rate on new FRM should produce a higher level of refinancings, as borrowers either replace older, higher fixed-rate mortgages with new lower fixed-rate mortgages or replace ARMs with FRMs. Mortgage originations during the past two quarters indicate that these two effects, indeed, are occurring. For example, ARMs accounted for 49.5 percent of total mortgage portfolios at the end of the first quarter of 1998. This represents a noticeable decline from the 52 percent ARM share at the end of 1997.

Anthony Cornyn, CFA  
Jonathan Jones, Ph.D.

**Chart 1**  
**Sensitivity Measure**

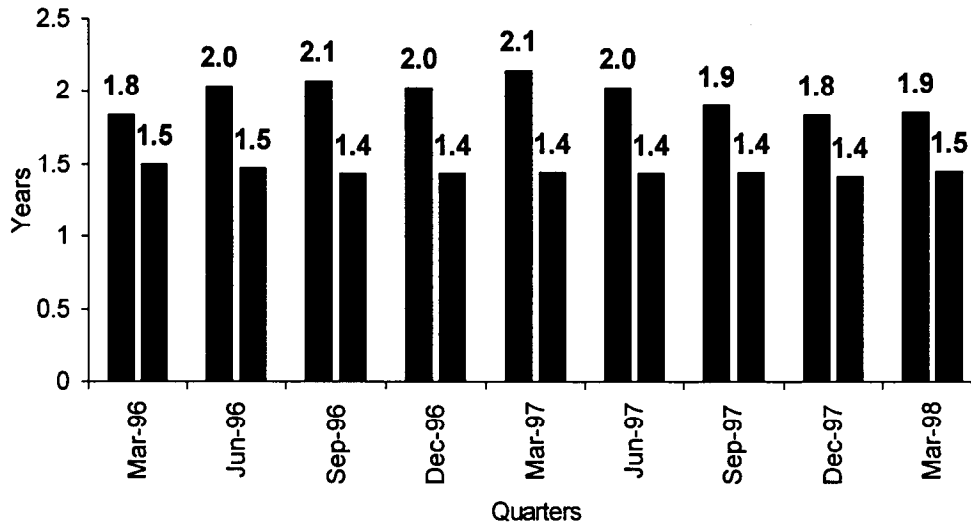


**Chart 2**  
**Treasury Yield Curves**



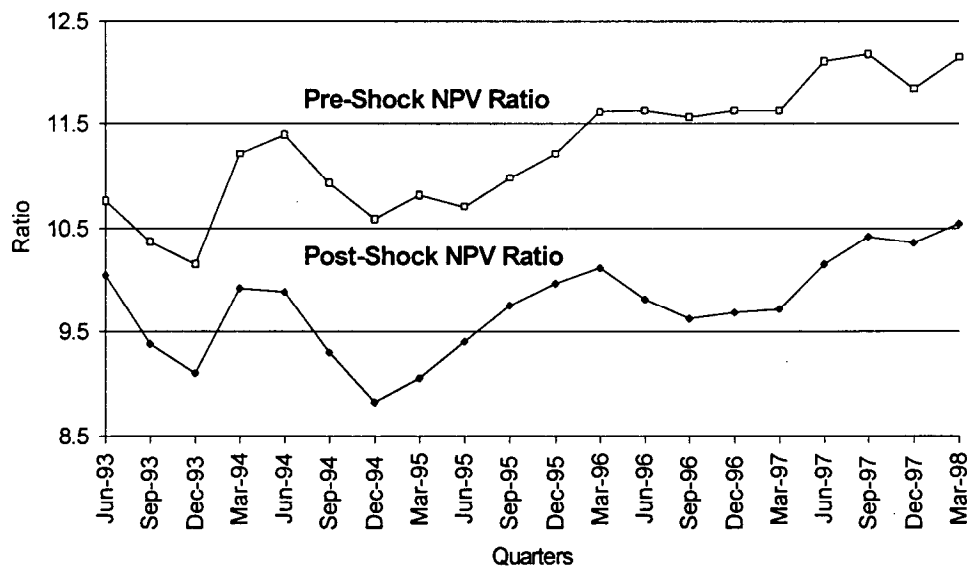
Source: Bloomberg

**Chart 3**  
**Duration of Assets and Liabilities**

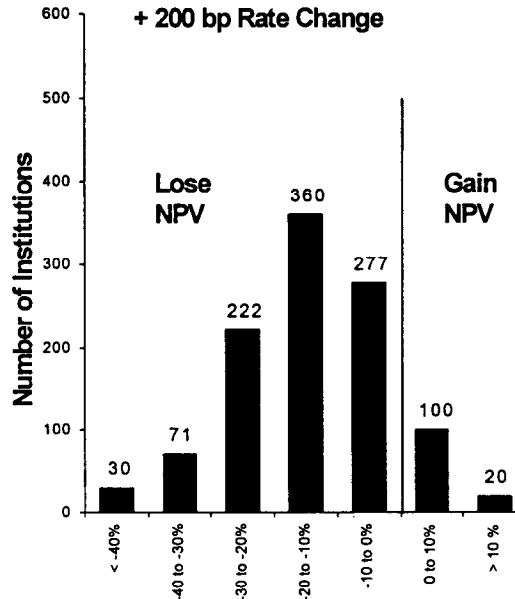
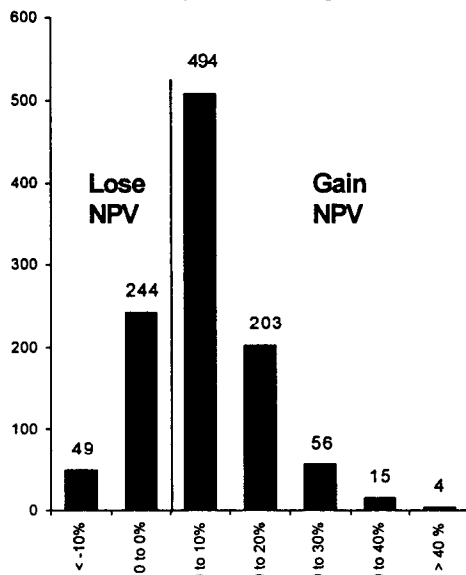


Note: Aggregate industry data. Asset durations have been adjusted to exclude deposit intangibles; liability durations have been adjusted to include deposit intangibles.

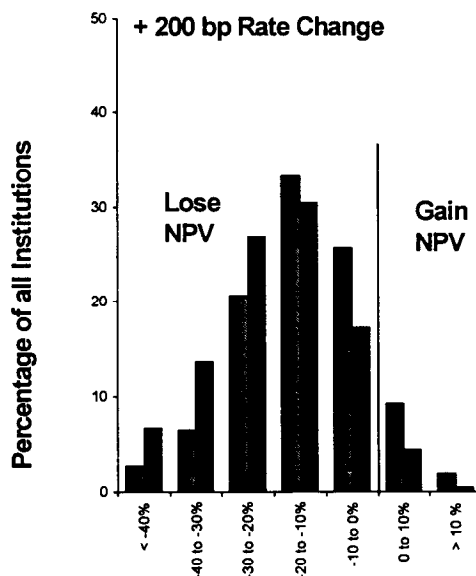
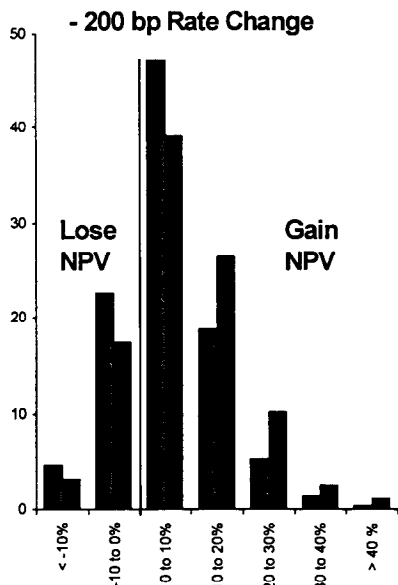
**Chart 4**  
**Median Pre-Shock and Post-Shock NPV Ratios**



**Chart 5**  
**Estimated Change in NPV**  
**(Industry Distributions, First Quarter 1998)**  
 - 200 bp Rate Change



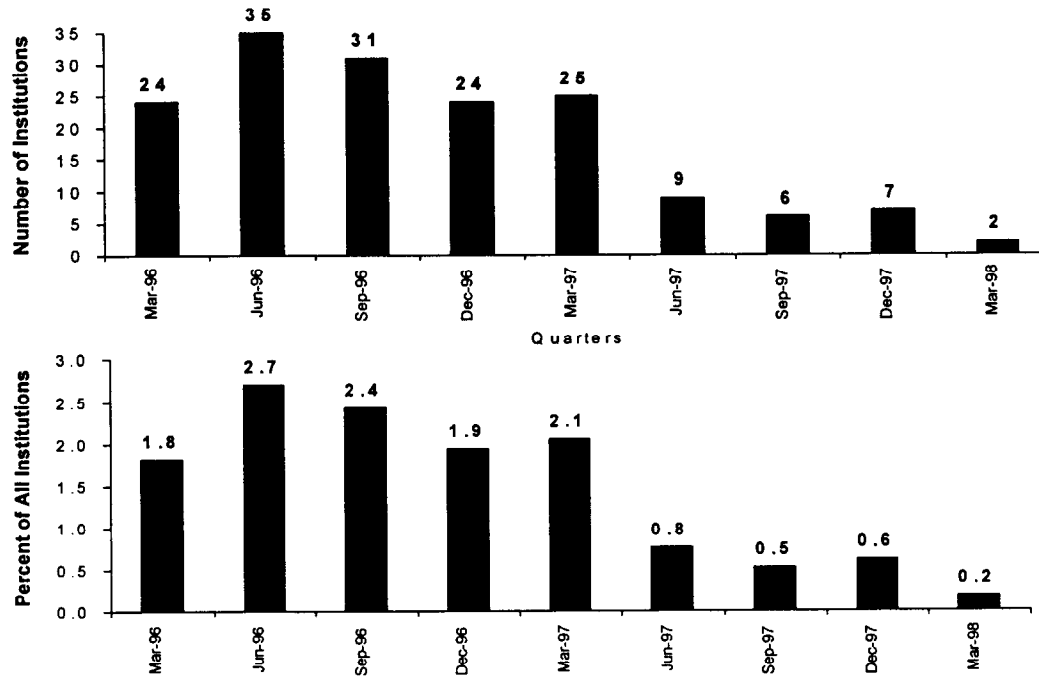
**Chart 6**  
**Estimated Change in NPV**  
**(Industry Distributions - Percentage of Total)**



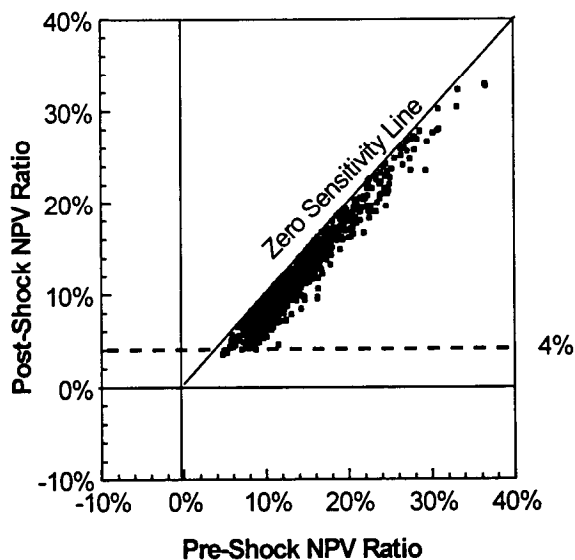
■ Q1, 1998

■ Q1, 1997

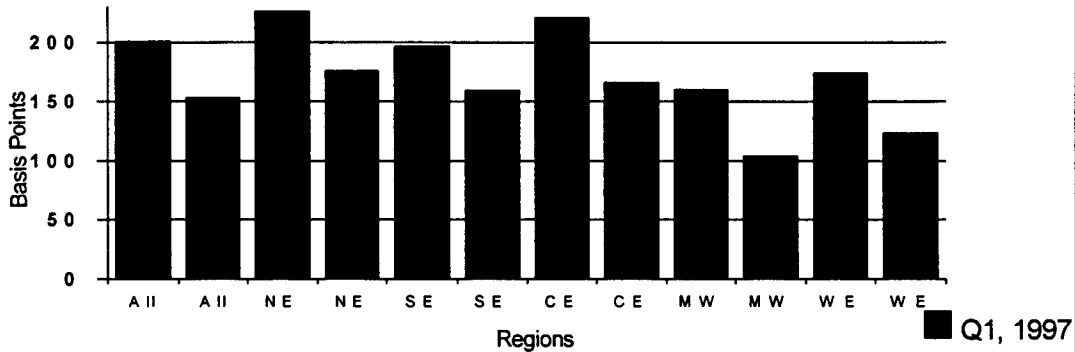
**Chart 7**  
**Institutions with Exposure Ratios Under 4.0 Percent**



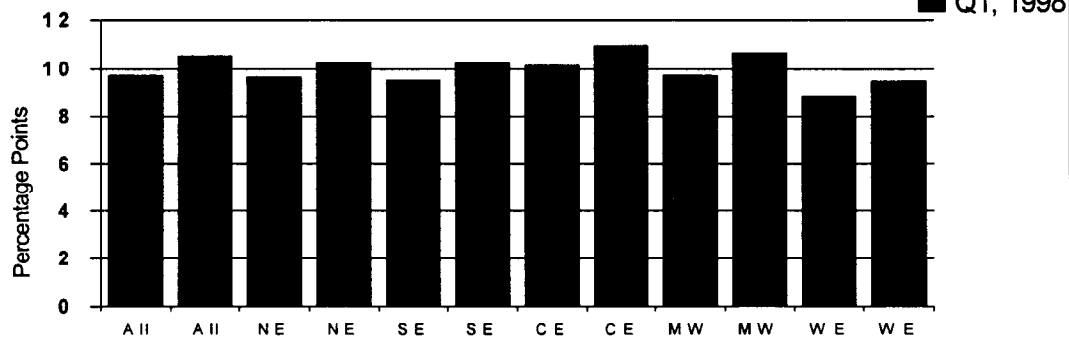
**Chart 8**  
**Sensitivity Chart**  
**(First Quarter 1998)**



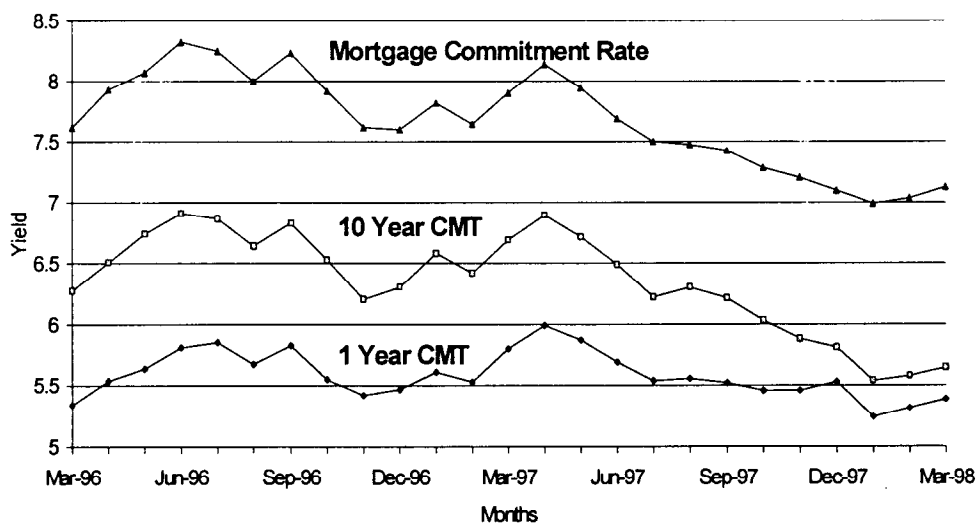
**Chart 9**  
**Median Sensitivity Measure**



**Median Post-Shock NPV Ratio**



**Chart 10**  
**Mortgage-Related Interest Rate Indices**



**Table 1**  
**Interest Rate Risk Measures**  
 (Industry Aggregate Data)

Change in Interest Rates (Basis Points)	Percentage Change in NPV			Ratio of NPV to Assets		
	Mar-97	Dec-97	Mar-98	Mar-97	Dec-97	Mar-98
+300	-36.3	-28.9	-27.9	6.8	7.6	8.0
+200	-22.3	-16.7	-16.4	8.1	8.8	9.1
+100	-10.0	-6.8	-6.7	9.2	9.7	10.0
Base Case	0.0	0.0	0.0	10.1	10.2	10.6
-100	6.4	3.4	3.4	10.6	10.5	10.8
-200	8.6	5.0	4.4	10.7	10.6	10.8
-300	9.9	7.8	6.8	10.8	10.8	11.0

**Table 2**  
**Asset and Liability Durations and Thrift Sensitivity**

**Sensitivity Ranking**

	Most Sensitive (Top Decile)	Least Sensitive (Bottom Decile)
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**Duration of:**

Total Mortgages	1.96	1.36
Total Assets	1.75	1.23
Total Liabilities	1.45	1.49

**GLOSSARY**

<b>Pre-Shock NPV Ratio</b>	Equity-to-assets expressed in present value terms (i.e., base case NPV divided by present value of assets).
<b>Post-Shock NPV Ratio</b>	Equity-to-assets ratio expressed in present value terms following an adverse 200 basis point interest rate shock. Also referred to as the exposure ratio.
<b>Sensitivity Measure</b>	Difference between Pre-shock and Post-shock NPV Ratios (expressed in basis points).
<b>Estimated Change in NPV</b>	The percentage change in base case NPV caused by an interest rate shock.

*This publication is available from the OTS PubliFax by calling (202) 906-5660 and requesting document 35710. Additional interest rate risk publications from the Risk Management Division may be obtained from:*

*\* The OTS web site at <http://www.ots.treas.gov>*

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**End Notes:**

<sup>1</sup> Duration is a measure of the price sensitivity of a financial instrument for small changes in yield. The higher the duration of an instrument, the greater is its price sensitivity. For example, an asset with a duration of 1.6 will appreciate in value by about 1.6 percent for a one percentage point (100 basis points) decline in yield. The reverse would hold if yields rose by one percent.